



Docket No.  
448563/0159  
LR:JFD

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant: Kazumichi Shimada et al. Art Unit: 2863  
Application No.: 09/004,271 Examiner: Michael P. Nghiem  
Filed: January 7, 1998  
For: INK JET RECORDING APPARATUS

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DECLARATION OF SATOSHI SHINADA

Commissioner for Patents  
P.O. Box 1450  
Alexandria, VA 22313-1450

Sir:

Sir:

This Declaration is submitted by the undersigned, Satoshi Shinada, who makes the following Declaration:

1. I make this declaration in support of the patentability of the subject design.

I am also an employee of Seiko Epson Corporation, the assignee of this application. I am familiar with this application and the prosecution of this application before the U.S. Patent Office, including the Office Action of October 16, 2003.

2. Claim 27 of the above-referenced application is directed to an ink cartridge and requires a plurality of ink storage chambers consisting of exactly five ink storage chambers, storing ink of exactly five different colors. All of the ink storage chambers are collectively integrally formed in the ink cartridge and the different chambers of the five different colors are adjacent to each other. None of the ink storage chambers store black ink. The ink storage chambers store light cyan ink, deep cyan ink, light magenta ink, deep magenta ink and

yellow ink. Further, each ink storage chamber has an ink supply port, and all ink supply ports are aligned on one straight line. As is discussed below, the use of exactly five collectively integrally formed ink chambers storing ink of the colors light cyan ink, deep cyan ink, light magenta ink, deep magenta ink and yellow ink, as opposed to using a greater number of colors and corresponding ink chambers, is an important part of the invention and leads to important and unexpected benefits. In addition, the fact that none of the ink storage chambers store black ink also leads to beneficial results.

3. I can read English with the help of a Japanese/English dictionary. I have read and understand European Patent Application Publication No. EP-0 532 302 A to Danzuka et al. Danzuka describes an ink cartridge having eight recording heads. The eight recording heads are for inks of colors light black, dark black, light cyan, dark cyan, light magenta, dark magenta, light yellow and dark yellow. Included in the cartridge are tanks for light black ink and dark black ink.

4. I have read and understand U.S. Patent Application Serial No. 4,672,432 to Sakurada et al. Sakurada describes an ink jet printing system including eight main tanks for the colors high-density black, low-density black, high-density yellow, low-density yellow, high-density cyan, low-density cyan, high-density magenta and low-density magenta. Sakurada also describes another system having six main ink tanks for the colors black, yellow, high-density cyan, low-density cyan, high-density magenta and low-density magenta. Both of the described systems include ink tanks for black ink.

5. While the quality of full color printing is typically improved by increasing the number of kinds of color inks to more than five inks, as is described in the cited references

(Danzuka and Sakurada), the use of more than five ink colors as described in the cited references leads to certain inefficiencies.

6. In addition, while conventional wisdom and the cited references describe and express a preference for a greater number of colors and corresponding ink chambers, full color printing may be achieved with the five colors of yellow, light cyan, dark cyan, light magenta and dark magenta, as claimed by the present application.

7. It has been determined by applicants that generally, the additional color (non-black) inks used by the cited references, beyond the five color (non-black) inks claimed by the present application, are used significantly less often than are the five color inks and corresponding ink chambers claimed by the present application.

8. Because of this inequality of use amongst the different colors and corresponding ink chambers, an inefficiency is caused when more than five colors are used in conjunction with a unitary integral ink cartridge. Specifically, ink colors beyond the five color (non-black) inks that are claimed are used at a lesser rate than those that are claimed. Because, with a unitary integrated ink cartridge, the cartridge is typically replaced when any one of the ink chambers becomes empty, in many cases, ink chambers for colors beyond the five claimed by the present application would tend to have some residual ink when the ink cartridge must be removed, thus resulting in an inefficiency.

9. Another drawback of using more than the claimed number of color ink chambers, as is done by the cited references, is that such an ink cartridge typically must be made larger to accommodate the larger number of chambers. A larger ink cartridge results in inefficiencies of both storage and printer design.

10. Another benefit of the claimed ink cartridge as compared to the cartridges described by the cited references is that the claimed cartridge does not contain a chamber for black ink, as do the cartridges described in the cited references.

11. A benefit of not including a chamber for black ink, and thus employing a separate cartridge for black ink, is that the black ink cartridge may be replaced separately and independently of the claimed color ink cartridge. Such a scenario is beneficial because the black ink is typically consumed at a much greater rate than the other color inks during typical printing operations.

12. Accordingly, due to these novel, non-obvious and beneficial differences from the cartridges described in the cited references claimed by the present application, I believe that the claimed invention is patentable over the cited references.

I hereby declare that all statements made herein of my own knowledge are true and all statements made on information and belief are believed to be true, and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code, and that such willful false statement may jeopardize the validity of the application or any patent issuing thereon.

Satoshi Shinada  
Name: Satoshi Shinada

Date: February 16, 2004

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